

REPORT OF
GEOTECHNICAL EXPLORATION PROGRAM
GRIGNON HOME RENOVATION
KAUKAUNA, WISCONSIN
8100-86-276



twin city testing
corporation



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corporation

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April 4, 1986

Outagamie County Historical Society
Attn: Ms Joellyn Wallangk
330 East College Avenue
Appleton, WI 54914

Subj: Report of Geotechnical Exploration Program
Grignon Home Renovation
Kaukauna, Wisconsin
8100-86-276

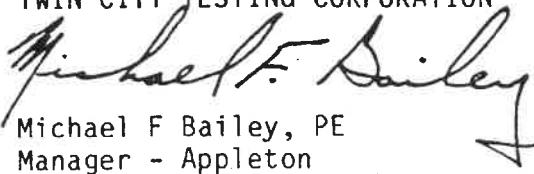
Dear Ms Wallangk

We have completed a geotechnical exploration program for the Grignon home in Kaukauna, Wisconsin. This work was done in accordance with your February 17, 1986 authorization.

The soil samples obtained in the borings will be held for one month from the date of this report. They will then be discarded unless we are requested to store or ship them.

If you have any questions regarding this report, or if we can be of further service to you, please contact us.

Very truly yours
TWIN CITY TESTING CORPORATION


Michael F Bailey, PE
Manager - Appleton

MFB/dsp

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REPORT OF GEOTECHNICAL EXPLORATION PROGRAM

PROPOSED GRIGNON HOME RENOVATION

KAUKAUNA, WISCONSIN

8100-86-276

INTRODUCTION

We understand the foundation under the historic Grignon home in Kaukauna, Wisconsin is to be reconstructed. We were requested by Ms Joellyn Wallangk of the Outagamie County Historical Society to conduct a geotechnical exploration program for this project. The scope of our work was limited to:

1. Performing four standard penetration test soil borings in the vicinity of the existing home.
2. Reviewing the soils encountered in the borings and preparing logs illustrating the soil strata.
3. Preparing a report recommending allowable soil bearing pressures and estimates of foundation settlement. The report was also to discuss vibrations associated with the nearby quarry operation.

EXPLORATION PROGRAM RESULTS

Surface Conditions

The Grignon home is located on Augustine Street adjacent to the Murphy Quarry. The building is presently surrounded by a



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grass lawn. The quarry is approximately 110 feet east of the house.

Subsurface Conditions

The soil and water conditions encountered at the test boring locations are illustrated by means of the attached boring logs. The logs also indicate the probable geologic origin of the encountered soils and other pertinent information.

The boring locations are shown on the attached site sketch. We wish to point out that the subsurface conditions at other times and locations on the site may differ from those found at our test locations. If different conditions are encountered during construction, it is necessary to contact us so that our recommendations can be reviewed.

The soil borings encountered up to 2 1/2 feet of organic lean clay topsoil or fill overlying lean clay alluvial soils. The standard penetration test N values indicate the lean clay soils were generally in a medium to rather stiff condition. Weathered bedrock was encountered at depths of 7 1/2 to 8 feet. This is the same material as is excavated in the adjacent quarry and appears to be dolomite.



Water Conditions

Water levels did not develop in the soil borings during the course of the exploration program. Water levels, however, would require a long period of time to stabilize in these soil types. In our opinion, perched water conditions could also develop over the bedrock resulting in temporary high ground water conditions.

Laboratory Testing

Moisture content tests were performed on selected soil samples to aid in our engineering review. The results of these tests are recorded on the attached soil boring logs adjacent to the samples tested. These tests were performed in accordance with ASTM procedures.

ENGINEERING REVIEW

Project Information

The following information represents our understanding of the proposed construction. It comprises an important part of our engineering review. If there are any changes in the nature, design, grades or locations of the structure, it is necessary that we be contacted so that we may review our recommendations.

We understand the existing home was constructed in 1837. The original home is 40 by 30 feet in plan dimension with a 20 by 20 foot addition in the back. The house is a three story, wood frame structure.

We understand the building is supported on river-rock foundation walls. These walls appear to extend 3 to 3 1/2 feet below the existing grade with no additional footing. Interior piers of river-rock with wooden posts were added by the WPA in 1940.

Plans are presently being prepared to excavate and construct a basement below the existing building. The house will be raised approximately 18 inches to aid in accomodating the basement. We have assumed the basement floor elevation will be placed high enough to avoid rock excavation. The surrounding lawns will be relandscaped to fit in with the new elevation.

We understand vibrations in the house can be felt from blasting operations in the nearby quarry. These vibrations have not caused any significant problems with the structure. The Outagamie County Historical Society, however, is concerned the new foundation may make vibrations in the building more significant.



Discussion

Based on our understanding of the project, it is our opinion that the new foundation system will make the structure more resistant to damage from vibrations associated with the blasting operations. We believe there is a low probability of damage to the new foundation walls related to controlled blasting performed in a conscientious manner. In our opinion, neoprene pads or similar devices would not be applicable to this situation. We have assumed in our analysis that the quarry operation would operate in a reasonable and prudent manner and in general accordance with U S Bureau of Mines guidelines. This ordinarily would include monitoring ground vibration and airblast from blasting conducted in that area of the quarry closest to the subject building.

Foundations

We recommend placing at least six inches of compacted granular fill below the foundations and basement floor slab. This material should be a clean sand or gravel with less than 5% passing a #200 sieve. In our opinion, footings bearing on the compacted granular fill could be proportioned for a soil bearing pressure of up to 4,000 pounds per square foot (psf). We estimate that foundation settlements will be less than 1/2 inch.

Additional Recommendations

The lean clay soils encountered in the soil borings are in a very moist condition. We do not recommend using this material as fill under buildings or other structures. This material is suitable for fill in lawn areas if some minor settlements can be tolerated. It may be advantageous to strip and stockpile the existing topsoil for reuse after the new grades have been established.

Because of the potential for perched ground water conditions to develop, we recommend installing a perimeter draitile system.

EXPLORATION PROCEDURES

General

The soil borings were conducted with a CME 45 rotary drill rig on February 25, 1986. The soil boring locations were determined by Twin City Testing Corporation. The surface elevations at the boring locations were referenced to the floor at the front entrance-way. The elevation at that point was assumed to be 100.0 feet.



Sampling

Soil sampling was done in accordance with ASTM:D1586. Using this procedure, a 2" O D split barrel sampler is driven into the soil by a 140 lb weight falling 30". After an initial set of 6" the number of blows required to drive the sampler an additional 12" is known as the penetration resistance or N value. The N value is an index of the relative density of cohesionless soils or the consistency of cohesive soils.

Classification

As the samples were obtained in the field, they were visually and manually classified by the crew chief in accordance with ASTM:D2488. Representative samples were then returned to the laboratory for further examination and for verification of the field classification. Logs of the borings indicating the depth and identification of the various strata, the N value, water level information and pertinent information regarding the method of maintaining and advancing the drill holes are attached. Charts illustrating the soil classification procedure, the descriptive terminology and the symbols used on the boring logs are also attached.



STANDARD OF CARE

The recommendations contained in this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted engineering practices at this time and location. Other than this, no warranty is implied or intended.

This report was prepared by:

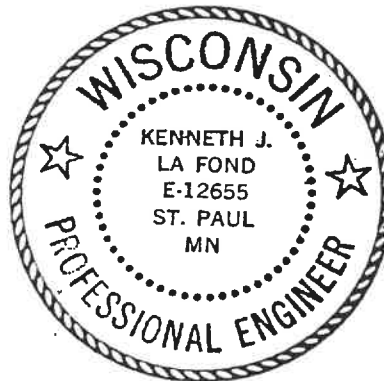
David A. Erickson

David A Erickson, EIT
Geotechnical Engineer

This report was reviewed by:

Kenneth J. LaFond

Kenneth J LaFond, PE
Chief Geotechnical Engineer



Proofread by:

Camela Spragler



LOG OF TEST BORING

JOB NO 8100-86-276

VERTICAL SCALE 1" = 2'

BORING NO 1

PROJECT GRIGNON HOME RENOVATION, KAUKAUNA, WISCONSIN

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS			
					NO	TYPE	W	D	LL P.L	Qu
	SURFACE ELEVATION 99.3									
	ORGANIC LEAN CLAY, dark brown, frost to 1' (OL)	TOPSOIL			1	A				
2½	LEAN CLAY, with sand, reddish brown, medium (CL)	FINE ALLUVIUM	8		2	SB				
4½	LEAN CLAY, reddish brown, rather stiff (CL)		11		3	SB				
7½	SILTY SAND, with gravel, yellowish brown, moist, loose, (see #1)	WEATHERED BEDROCK	5 0.5'		4	SB	21			
8	REFUSAL									
	#1 lens of sandy lean clay (SM)									

WATER LEVEL MEASUREMENTS

START 2-25-86 COMPLETE 2-25-86

METHOD @ 11:30

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	BAILED DEPTHS	WATER LEVEL
2-25	11:35	7½'	none	8'	to	none
					to	
					to	
					to	

HSA 0' to 8'

CREW CHIEF PINGEL

LOG OF TEST BORING

JOB NO 8100-86-276

VERTICAL SCALE 1" = 2'

BORING NO 2

PROJECT GRIGNON HOME RENOVATION, KAUKAUNA, WISCONSIN

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS			
					NO	TYPE	W	D	LL PL	Qu
	SURFACE ELEVATION 98.6'									
1½	ORGANIC LEAN CLAY, dark brown, frost to 1' (OL)	TOPSOIL			1	A				
5	LEAN CLAY, reddish brown, medium, laminations of sand, laminations of dark brown lean clay (CL)	FINE ALLUVIUM	7		2	SB	24			
7	LEAN CLAY, with sand, reddish brown, rather stiff (CL)		9		3	SB				
7½	LEAN CLAY, reddish (see #1)		4 0.5'		4	SB				
	REFUSAL									
	#1 brown, medium, lens of weathered silty sand (CL)									

WATER LEVEL MEASUREMENTS

START 2-25-86 COMPLETE 2-25-86

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	BAILED DEPTHS	WATER LEVEL	METHOD	@
2-25	10:30	7½'	none	7½'	10	none	HSA 0' to 7½'	10:25
					10			
					10			
					10			

CREW CHIEF PINGEL

LOG OF TEST BORING

JOB NO 8100-86-276 VERTICAL SCALE 1" = 2' BORING NO 3
 PROJECT GRIGNON HOME RENOVATION, KAUKAUNA, WISCONSIN

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS			
					NO	TYPE	W	D	LL PL	Qu
	SURFACE ELEVATION <u>99.1'</u>									
$\frac{1}{2}$	FILL, Organic Lean Clay, (see #1)	FILL								
	ORGANIC LEAN CLAY, dark brown (OL)	TOPSOIL			1	A				
$2\frac{1}{2}$	LEAN CLAY, reddish brown, rather stiff, laminations of dark brown lean clay (CL)	FINE ALLUVIUM	9		2	SB				
$4\frac{1}{2}$	LEAN CLAY, reddish brown, rather stiff (CL)		12		3	SB	27			
$7\frac{1}{2}$	LEAN CLAY, with sand, (see #2)		$\frac{7}{0.5'}$		4	SB				
8	REFUSAL									
	#1 dark brown, frost to 6"									
	#2 reddish brown, rather stiff, lens of weathered silty sand (CL)									

WATER LEVEL MEASUREMENTS

START 2-25-86 COMPLETE 2-25-86

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	BAILED DEPTHS	WATER LEVEL	METHOD	
2-25	12:05	$7\frac{1}{2}'$	none	8'	to	none	HSA 0' to 8'	@ 12:00
					to			
					to			
					to			
					to			
							CREW CHIEF	PINGEL

LOG OF TEST BORING

JOB NO 8100-86-276 VERTICAL SCALE 1" = 2' BORING NO 4
 PROJECT GRIGNON HOME RENOVATION, KAUKAUNA, WISCONSIN

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS			
					NO	TYPE	W	D	LL PL	Qu
	SURFACE ELEVATION <u>98.7'</u>									
	ORGANIC LEAN CLAY, dark brown, frost to 1' (OL)	TOPSOIL			1	A				
2½	LEAN CLAY, reddish brown, medium, laminations of dark brown lean clay (CL)	FINE ALLUVIUM	7		2	SB				
5	LEAN CLAY, reddish brown, medium, laminations of sand, lens of weathered silty sand at 7½' (CL)		8		3	SB				
			3 0.5'		4	SB	27			
7½	REFUSAL									

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	BAILED DEPTHS	WATER LEVEL
2-25	11:00	7½'	none	7½'	to	none
					to	
					to	
					to	

START 2-25-86 COMPLETE 2-25-86

METHOD HSA 0' to 7½' @ 10:55

CREW CHIEF PINGEL

GENERAL NOTES

DRILLING AND SAMPLING SYMBOLS

SYMBOL	DEFINITION
HSA	3 1/4" I.D. Hollow Stem Auger
_FA	4", 6" or 10" Diameter Flight Auger
_HA	2", 4" or 6" Hand Auger
_DC	2 1/2", 4", 5" or 6" Steel Drive Casing
_RC	Size A, B, or N Rotary Casing
PD	Pipe Drill or Cleanout Tube
CS	Continuous Split Barrel Sampling
DM	Drilling Mud
JW	Jetting Water
SB	2" O.D. Split Barrel Sample
_L	2 1/2" or 3 1/2" O.D. SB Liner Sample
_T	2" or 3" Thin Walled Tube Sample
3TP	3" Thin Walled Tube (Pitcher Sampler)
_TO	2" or 3" Thin Walled Tube (Osterberg Sampler)
W	Wash Sample
B	Bag Sample
P	Test Pit Sample
_Q	BQ, NQ, or PQ Wireline System
_X	AX, BX, or NX Double Tube Barrel
CR	Core Recovery - Percent
NSR	No Sample Recovered, classification based on action of drilling equipment and/or material noted in drilling fluid or on sampling bit.
NMR	No Measurement Recorded, primarily due to presence of drilling or coring fluid.
	Water Level Symbol

TEST SYMBOLS

SYMBOL	DEFINITION
W	Water Content - % of Dry Wt. - ASTM D 2216
D	Dry Density - Pounds Per Cubic Foot
LL, PL	Liquid and Plastic Limit - ASTM D 4318
Additional Insertions in Last Column	
Qu	Unconfined Comp. Strength-psf - ASTM D 2166
Pq	Penetrometer Reading - Tons/Square Foot
Ts	Torvane Reading - Tons/Square Foot
G	Specific Gravity - ASTM D 854
SL	Shrinkage Limits - ASTM D 427
OC	Organic Content - Combustion Method
SP	Swell Pressure - Tons/Square Foot
PS	Percent Swell
FS	Free Swell - Percent
pH	Hydrogen Ion Content, Meter Method
SC	Sulfate Content - Parts/Million, same as mg/L
CC	Chloride Content - Parts/Million, same as mg/L
C*	One Dimensional Consolidation - ASTM D 2435
Qc*	Triaxial Compression
D.S.*	Direct Shear - ASTM D 3080
K*	Coefficient of Permeability - cm/sec
D*	Dispersion Test
DH*	Double Hydrometer - ASTM D 4221
MA*	Particle Size Analysis - ASTM D 422
R	Laboratory Resistivity, in ohm - cm - ASTM G 57
E*	Pressuremeter Deformation Modulus - TSF
PM*	Pressuremeter Test
VS*	Field Vane Shear - ASTM D 2573
IR*	Infiltrometer Test - ASTM D 3385
RQD	Rock Quality Designation - Percent

* See attached data sheet or graph

WATER LEVEL

Water levels shown on the boring logs are the levels measured in the borings at the time and under the conditions indicated. In sand, the indicated levels may be considered reliable ground water levels. In clay soil, it may not be possible to determine the ground water level within the normal time required for test borings, except where lenses or layers of more pervious waterbearing soil are present. Even then, an extended period of time may be necessary to reach equilibrium. Therefore, the position of the water level symbol for cohesive or mixed texture soils may not indicate the true level of the ground water table. Perched water refers to water above an impervious layer, thus impeding in reaching the water table. The available water level information is given at the bottom of the log sheet.

DESCRIPTIVE TERMINOLOGY

DENSITY TERM	"N" VALUE	CONSISTENCY TERM	Lamination	Up to 1/2" thick stratum
Very Loose	0-4	Soft	Layer	1/2" to 6" thick stratum
Loose	5-8	Medium	Lens	1/2" to 6" discontinuous stratum, pocket
Medium Dense	9-15	Rather Stiff	Varved	Alternating laminations of clay, silt and /or fine grained sand, or colors thereof
Dense	16-30	Stiff	Dry	Powdery, no noticeable water
Very Dense	Over 30	Very Stiff	Moist	Below saturation
Standard "N" Penetration: Blows Per Foot of a 140 Pound Hammer Falling 30 inches on a 2 inch OD Split Barrel Sampler			Wet	Saturated, above liquid limit
			Waterbearing	Pervious soil below water

RELATIVE GRAVEL PROPORTIONS

CONDITION	TERM	RANGE
Coarse Grained Soils	A little gravel	2 - 14%
	With gravel	15 - 49%
Fine Grained Soils		
15-29% + No. 200	A little gravel	2 - 7%
15-29% + No. 200	With gravel	8 - 29%
30% + No. 200	A little gravel	2 - 14%
30% + No. 200	With gravel	15 - 24%
30% + No. 200	Gravelly	16 - 49%

RELATIVE SIZES

Boulder	Over 12"
Cobble	3" - 12"
Gravel	
Coarse	3/4" - 3"
Fine	#4 - 3/4"
Sand	
Coarse	#4 - #10
Medium	#10 - #40
Fine	#40 - #200
Silt & Clay	- #200, Based on Plasticity

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

ASTM Designation: D 2487 - 83

(Based on Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification		
				Group Symbol	Group Name ^B	
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines ^C	$C_u \geq 4$ and $1 \leq C_c \leq 3^E$	GW	Well graded gravel ^F	
			$C_u < 4$ and/or $1 > C_c > 3^E$	GP	Poorly graded gravel ^F	
		Gravels with Fines More than 12% fines ^C	Fines classify as ML or MH	GM	Silty gravel ^{F,G,H}	
			Fines classify as CL or CH	GC	Clayey gravel ^{F,G,H}	
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines ^D	$C_u \geq 6$ and $1 \leq C_c \leq 3^E$	SW	Well-graded sand ^I	
			$C_u < 6$ and/or $1 > C_c > 3^E$	SP	Poorly graded sand ^I	
		Sands with Fines More than 12% fines ^D	Fines classify as ML or MH	SM	Silty sand ^{G,H,I}	
			Fines classify as CL or CH	SC	Clayey sand ^{G,H,I}	
	Fine-Grained Soils 50% or more passes the No. 200 sieve	Silt and Clays Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line ^J	CL	Lean clay ^{K,L,M}
				PI < 4 or plots below "A" line ^J	ML	Silt ^{K,L,M}
organic			$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OL	Organic clay ^{K,L,M,N} Organic silt ^{K,L,M,O}	
Silt and Clays Liquid limit 50 or more			inorganic	PI plots on or above "A" line	CH	Fat clay ^{K,L,M}
				PI plots below "A" line	MH	Elastic silt ^{K,L,M}
		organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OH	Organic clay ^{K,L,M,P} Organic silt ^{K,L,M,O}	
Highly organic soils				PT	Peat	
Primarily organic matter, dark in color, and organic odor						

^ABased on the material passing the 3-in. (75-mm) sieve.

^BIf field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^CGravels with 5 to 12% fines require dual symbols:

GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

^DSands with 5 to 12% fines require dual symbols:

SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

$$C_u = \frac{D_{60}}{D_{10}} \quad C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^EIf soil contains $\geq 15\%$ sand, add "with sand" to group name.

^GIf fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^HIf fines are organic, add "with organic fines" to group name.

^IIf soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^FIf Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

^GIf soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^LIf soil contains $\geq 30\%$ plus no. 200, predominantly sand, add "sandy" to group name.

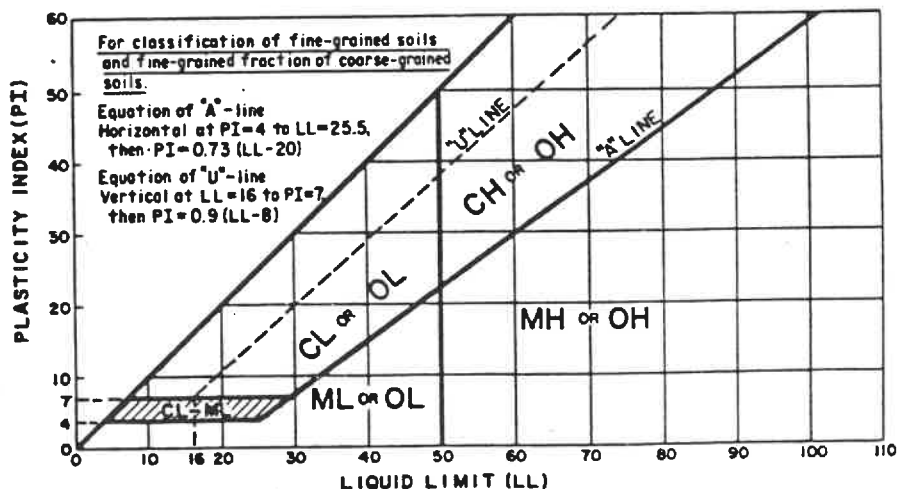
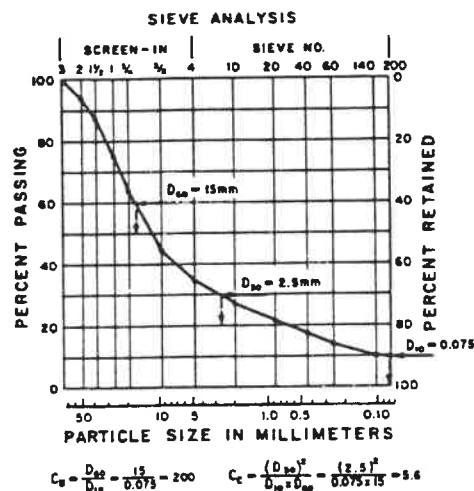
^MIf soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

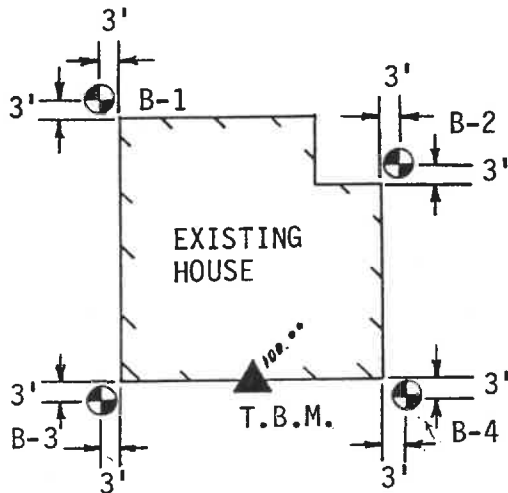
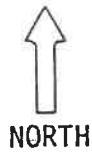
^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

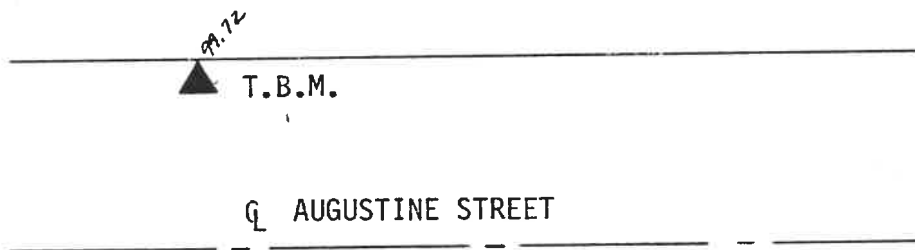
^PPI plots on or above "A" line.

^QPI plots below "A" line.





APPROXIMATE EDGE OF QUARRY



LEGEND



Denotes Boring Location



Denotes Temporary Bench Marks
(First Floor of House - Assumed
Elevation 100.0'; Arrow on Hydrant
Elevation 99.72')